

## FLAME STABILIZER DISCUSSION

1/8/91 AEN

For Unit 1, Installation during Spring '92 Outage

NOTE: Unit 1 will have new designed and fabricated burners.

### Basis of Recommendation:

Unit 1 Stabilizer Installation in Fall '91 on original burners.

#### Evaluation Restrictions:

1. Testing- Pulverizer 1H not available due to motor rewind (two times). Cannot check baseline AGASS data until Pulv 2H is available (testing required at all 8 pulv configurations).
2. Information- RJM report, test results and recommendations based on the Air Distribution Analysis (ADA) has not been issued.
3. Manpower- Have more testing scheduled than available manpower.

#### Scheduled Testing:

1. AGASS testing for O<sub>2</sub>, CO and NO<sub>x</sub> levels to determine distribution profiles (awaiting test rental equipment and Pulv 2H). We will have problems getting pulverizers from Maint (behind on inspections due to Pulv 2H).
2. Boiler Performance Testing (and Air Heater Testing) with and without reduced cooling air flow requirements. We expect an increase in boiler efficiency due to a reduction in cooling air requirements).
3. Clean Air Flow Testing to determine how effective coal pipe restrictor changeouts were and if other changes required.
4. Pulverizer Fineness testing (on all pulvs) to correlate LOIs with pulv performance.

#### Known Operational Effects based on Unit 1 Observations:

1. Flame Shape/Pattern- Flames are quite different (improved) from before Outage or on Unit 1's. Flames are pushed out 6 to 18" from burner front, shapes are more uniform with good initial shape and bushy and flared tails. Perimeter air loading, however, is not uniform. There is severe flow distribution patterns picked up visibly and by test results.
2. Scanner Operation- Most adjustments made to new burner setup was based on stabilizer design and air distribution. Exceptions to this were compromises made for scanner operation. Relocation of scanners to outer zone should be considered.

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3. Burner Front Temperatures- Burner front temperatures dropped 150 to 200 F (based on Pulv 2H o/s) which was one of the main objectives of the flame stabilizer installation.

4. NOx Levels- Indications on NOx are that there has been no appreciable changes. Additional detailed testing is required to evaluate more closely.

5. LOI Levels- Indications on LOIs are no appreciable change. Values track consistently below Unit 1's values.

6. Eyebrows- Unit 2 's eyebrows seem less severe than Unit 1's. Improved flame shapes seem to have helped this condition. However, with the low ash fusion coals would always expect some eyebrows.

7. Mechanical Integrity/Life of Stabilizer- Undeterminable at this time, requires outage for fireside inspection to determine mechanical integrity of stabilizer.

8. Life Extension of Burner- Undeterminable at this time, requires inspection to evaluate actual impact on burner.

9. Cooling Air Requirements for Out Of Service Burners- Based on the reduction of burner front temperatures, cooling air requirements could be significantly reduced. This would reduce leakage (blanketing air) and put the air requirements where we need them. A compromise between a realistic burner front temp (1200 vs 1350) and cooling air flow requirements would have to be worked out. Will require detailed testing and a controls modification for windbox damper positions on each burner row.

10. Boiler Performance- If cooling air flow requirements were reduced, an improvement in boiler performance could be realized.

#### Issues on Deciding Unit 1 Flame Stabilizers:

##### 1. Flame Stabilizers- Approval of Fabrication on Unit 1

###### Additional Modifications:

a. Modifications to B&W's new burner design- Who (when, where) will cut off the inner air sleeve and lighter shroud and attach the Flame Stabilizer to B&W's burner assembly.

b. New Swirl Number Calculation- RJM to calculate a new swirl design value based upon experience gained from Unit 2.

c. New Inner Diameter Dimension- With new burners the inner diameter tolerance could be lowered.

d. Lighter Shroud Diameter Increase- Due to concerns with lighters drooping Unit 2's diameter was enlarged.

e. Scanner Opening- There is a possibility of relocating the scanner opening into the outer zone (vs inner) for flame scanner improvements. This would eliminate the large inner zone opening. Consequences however, for the scanners not functioning properly (in all cases) in the outer zone would be serious. Would require outage and field cutouts of holes in inner zone (fireside picks).

2. Air istribution Analysis (Baseline and Balancing)- A recommendation of a baseline and balancing air flow test is made to set shrouds and backplates positions to equal air flow distribution.

3. Three Dimensional Analysis- This analysis is required to address air distribution problems associated with secondary air duct configurations. The analysis is a mathematical model from air heater outlet to furnace outlet. This item needs to be seriously considered. Still awaiting RJM report and final recommendations. Analysis could be conducted by either B&W or RJM. Note, this can also be justified in lieu on additional air flow monitoring instrumentation.

4. Ductwork Modifications- Air flow distribution problems can be corrected by straightening vanes, turning vanes, vortex breakers or other obstructions added to the ductwork. RJM would like to conduct a model to locate and size these items. B&W, however, states they can locate and install these without analysis (barnyard?).

5. Coal Pipe Restrictor Installation-

a. Retesting Unit 2- Scheduled

b. Modifying Unit 2 nozzles for Unit 1- In house or send out.

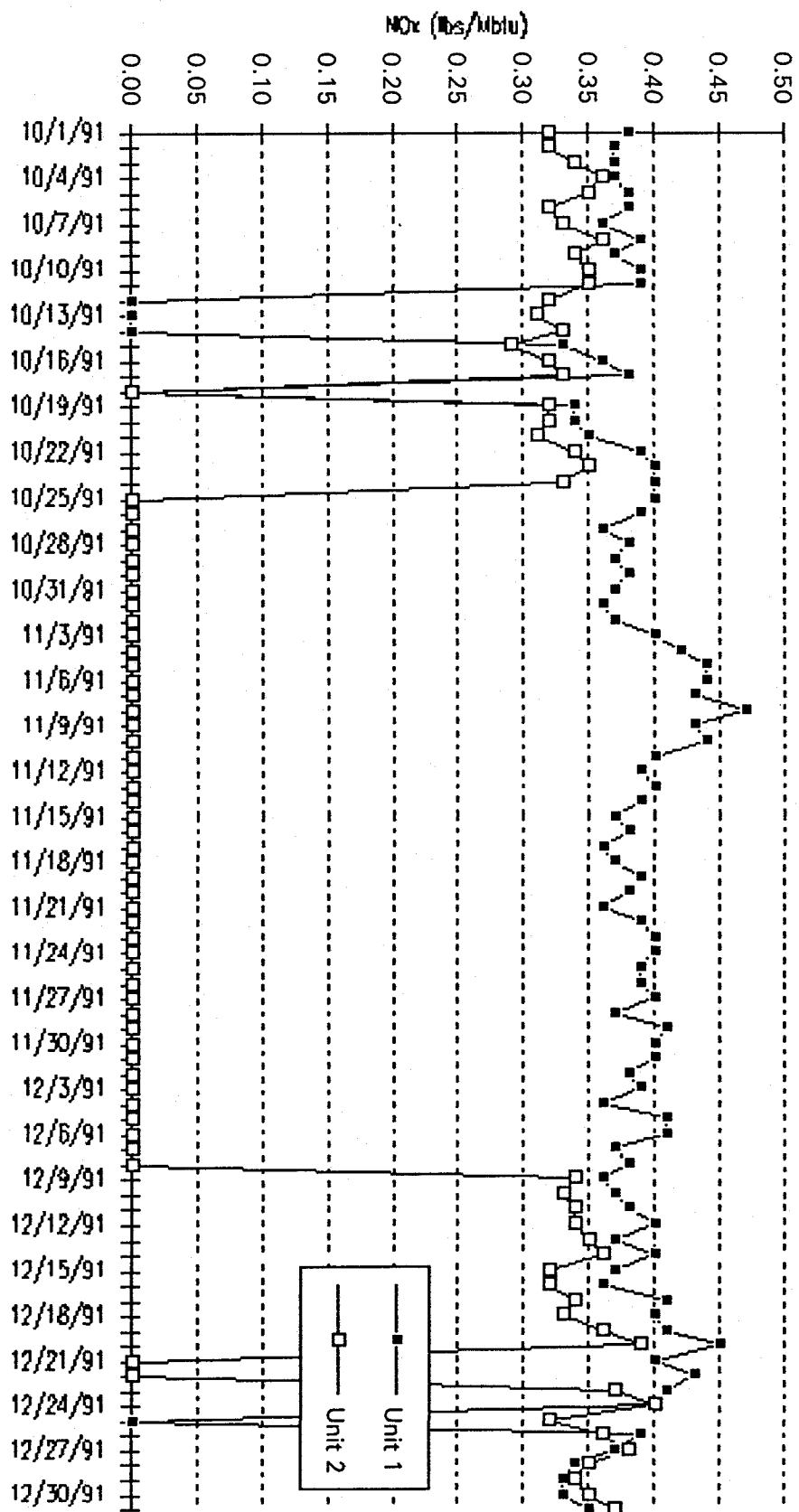
c. Installation IPSC or Contractor- IPSC Maintenance doesn't want to do installation because it would slow them down on pulverizer overhauls.

## Unit 1 Flame Stabilizers

### SUMMARY of DECISIONS (Assignments):

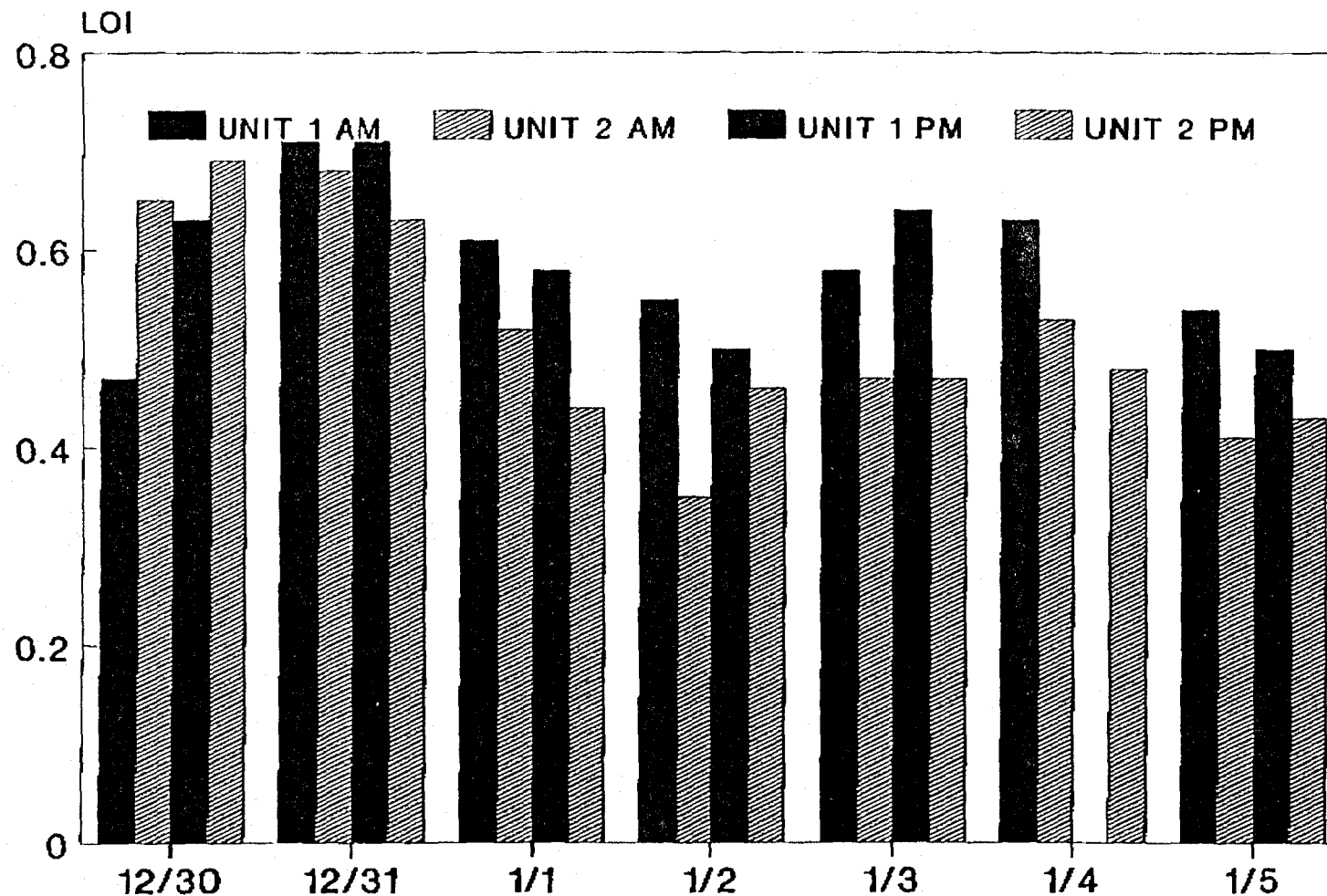
1. Flame Stabilizer- Approval?  
Need IPSC recommendation with specs noting new changes.  
Budget Funding- LA PO&M?
2. Flame Stabilizer Installation?  
B&W or Outside Contractor  
Factory or onsite installation?
3. Air Distribution and Balancing?  
Need IPSC recommendations and specs
4. 3-D Modeling Analysis?  
Need IPSC recommendations  
RJM or B&W?
5. Ductwork Modifications? (based on results of 3-D model)  
B&W or Outside Contractor?
6. Coal Pipe Restrictor Installation?  
IPSC or Outside contractor?
7. LA approvals?  
Submit as package or individually?  
LA meeting?

# NOx TREND ANALYSIS



# DELTA ASH LOI CHART

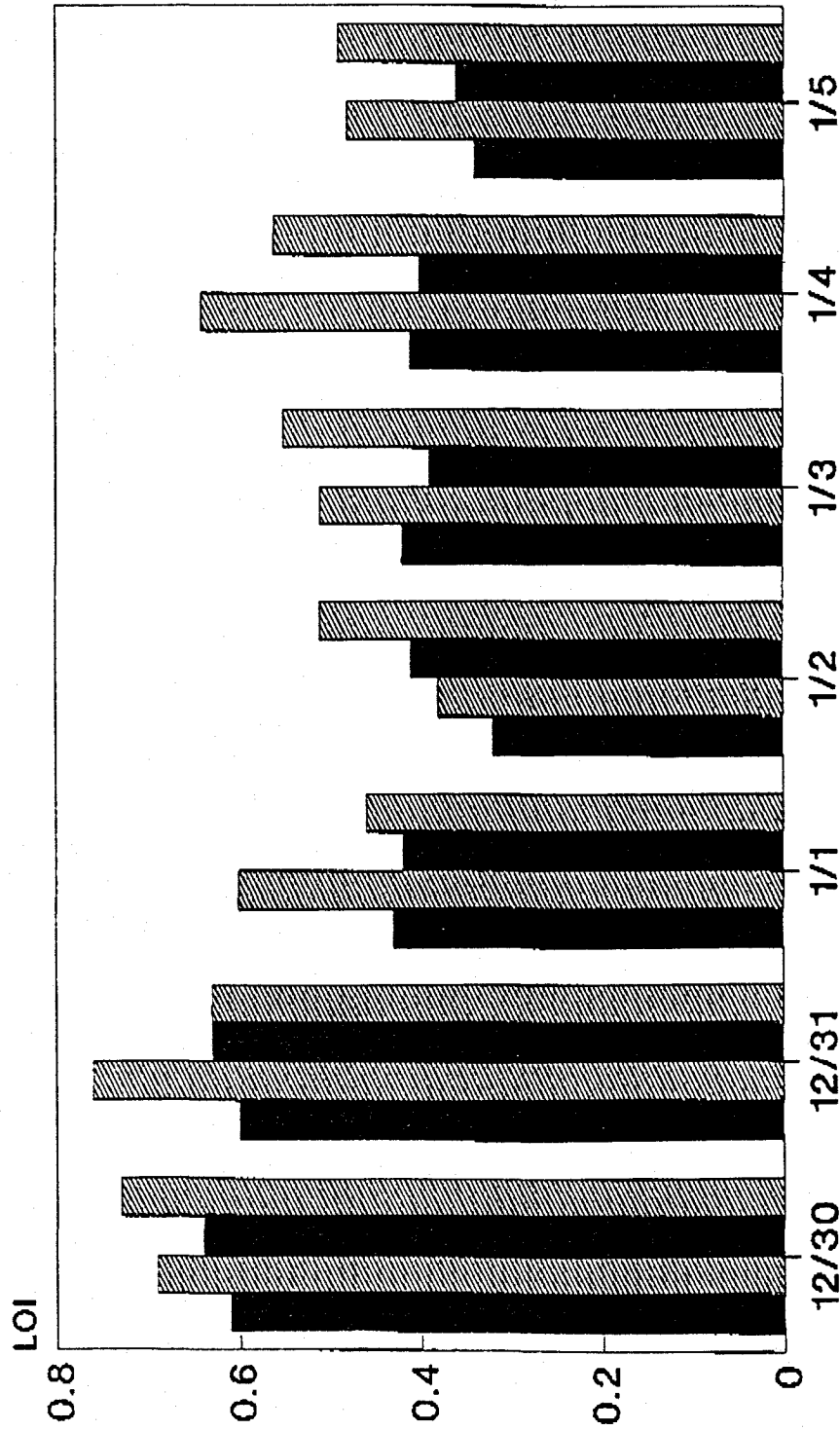
TOTAL AVERAGE -  
DECEMBER 1991/JANUARY 1992



# DELTA ASH LOI CHART

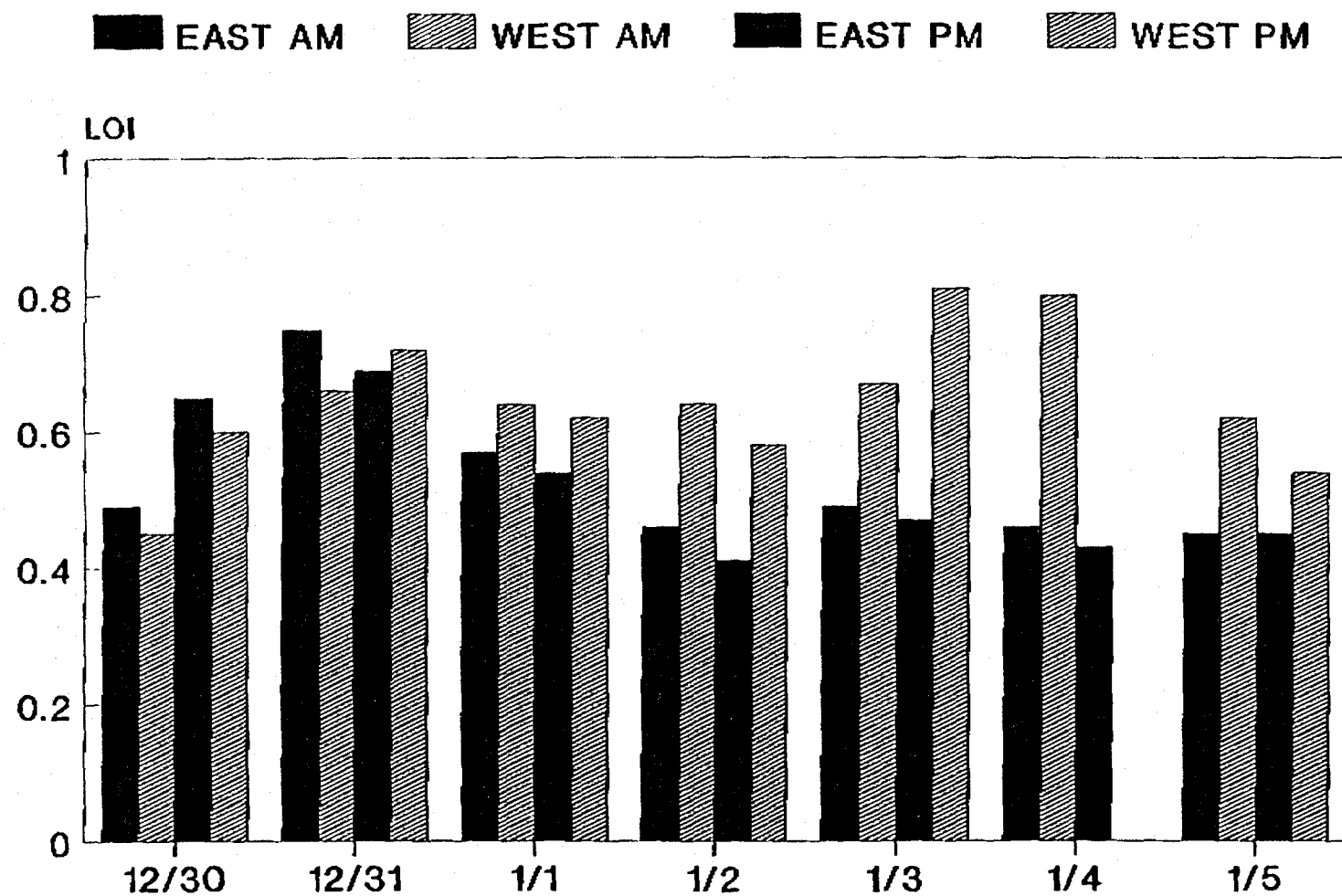
UNIT 2 - DECEMBER 1991 / JANUARY 1992

EAST AM
  WEST AM
  EAST PM
  WEST PM



# DELTA ASH LOI CHART

UNIT 1 - DECEMBER 1991 / JANUARY 1992



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